

Patent Claims

1. Method for fabricating a semiconductor structure having the steps of:

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providing a semiconductor substrate (10);

providing a plurality of trenches (G11, G12; G21) in the semiconductor substrate (10) using a first hard mask (50),
10 which trenches are arranged offset with respect to one another in rows (r1, r2) and columns (s1, s2, s3);

causing the hard mask (50) to recede by a predetermined distance (Δ) with respect to the trench wall at the top
15 side (OS) of the semiconductor substrate (10) for the purpose of forming a first hard mask (50') that has been caused to recede;

providing an isolation trench structure (ST) in the
20 semiconductor substrate (10) using a second hard mask (HM), the isolation trench structure (ST) subdividing the first first [sic] hard mask (50') that has been caused to recede along the rows (r1, r2) into strip sections (50₁', 50₂'; 50₃') and the strip sections (50₁'; 50₃') of adjacent rows
25 (r1, r2) being arranged offset with respect to one another;

the receding process resulting in a reduction of an overlap region (KB') between two strip sections (50₁'; 50₃') of adjacent rows (r1, r2) in comparison with an overlap region
30 (KB) which would be present without the receding process;

removing the second hard mask (HM); and

filling and planarizing the isolation trench structure (ST) with a filling material (FI) using the first hard mask (50') subdivided into the strip sections (50₁', 50₂'; 50₃').

5 2. Method according to claim 1,
characterized
in that the trenches (G11, G12; G21) each have a trench
capacitor with a corresponding filling (20), which is sunk
with respect to the top side (OS) of the semiconductor
10 substrate (10).

3. Method according to claim 1 or 2,
characterized
in that the receding process is realized by an isotropic,
15 preferably wet-chemical, etching process, as a result of
which the thickness of the hard mask (50') that has been
caused to recede is reduced in comparison with the
thickness of the hard mask (50).

20 4. Method according to one of the preceding claims,
characterized
in that the first hard mask (50) is composed of silicon
nitride.

25 5. Method according to one of the preceding claims,
characterized
in that the second hard mask (HM) is composed of silicon
oxide.

30 6. Method according to one of the preceding claims,
characterized
in that the filling material (FI) is composed of silicon
oxide.

7. Method according to one of the preceding claims,
characterized
in that the receding process results in complete
elimination of an overlap region (KB') between two strip
5 sections ($50_1'$; $50_3'$) of adjacent rows (r_1 , r_2).